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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,182	07/08/2003	Jong Hoon Kim	P68973US0	7113
136	7590	12/06/2004	EXAMINER	
JACOBSON HOLMAN PLLC 400 SEVENTH STREET N.W. SUITE 600 WASHINGTON, DC 20004			LUK, OLIVIA T	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 12/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/614,182

Applicant(s)

KIM ET AL.

Examiner

Olivia T Luk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4 and 7-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Ho et al. (6,645,851 B1).

In re claim 1, Ho et al. disclose (a) providing a semiconductor substrate **10** in which a lower film is formed (col. 5, line 31); (b) coating a first photoresist film **14** on the lower film **12** (col. 5, lines 40-42 and col. 6, lines 18-22); (c) depositing a second photoresist film **15** having a higher glass transition temperature than the first photoresist film **14** on the first photoresist film **14** (col. 7, lines 26-30); (d) implementing an exposure process and a wet development process using a photo mask to pattern the second photoresist film **15** and the first photoresist film **14**, thereby forming a first photoresist film pattern (col. 8, lines 1-18); (e) implementing RFP for the first photoresist film pattern to cause flow of the first photoresist film pattern, thus forming a second photoresist film pattern having a lower critical dimension than the first photoresist film pattern (col. 8, lines 1-20); and (f) implementing an etch process using the second photoresist film pattern as an etch mask for the lower film to pattern the lower film (col. 8, lines 20-28).

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In re claim 2, Ho et al. disclose the lower film is formed using TiN, SiON, Si₃N₄, organic anti-reflection coating of amorphous carbon series or an inorganic anti-reflection coating (col. 2, lines 33-40).

In re claim 3, Ho et al. disclose the difference in a glass transition temperature between the first photoresist film and the second photoresist film is 1-10° C (col. 6, lines 28-34; col. 7, lines 25-30).

In re claim 4, Ho et al. disclose the first photoresist film and the second photoresist film have the same physical properties other than the glass transition temperature (col. 6, lines 28-34; col. 7, lines 25-30).

In re claim 7, Ho et al. disclose the exposure process employs I-line, KrF, ArF, EUV, E-beam or X-ray as a photoresist (col. 6, lines 24-27).

In re claim 8, Ho et al. disclose during the RFP, a heating time is 50 - 200 seconds (col. 7, lines 4-5).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-6 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al. (6,645,851 B1).

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In re claim 5, Ho et al. disclose the first photoresist film is coated in thickness of 5000 to 35000 Angstroms, but fails to specify a thickness of 0.1 μm .

It would have been obvious to one having ordinary skill in the art to have coated the first photoresist film to a thickness of 0.1 μm , since it has been held that where the general conditions of an invention are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In re claim 6, Ho et al. disclose the second photoresist film is coated in thickness of 5000 to 35000 Angstroms, but fails to specify a thickness of 0.5 μm .

It would have been obvious to one having ordinary skill in the art to have coated the second photoresist film to a thickness of 0.5 μm , since it has been held that where the general conditions of an invention are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In re claim 9, Ho et al. are applied supra, but fail to specify the RFP is implemented at a temperature of 132°C for 90 seconds.

It would have been obvious to one having ordinary skill in the art to have the RFP is implemented at a temperature of 132°C for 90 seconds, since it has been held that where the general conditions of an invention are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In claim 10, Ho et al. are applied supra, but fail to specify the critical dimension of the first photoresist film pattern is 0.20 μm .

It would have been obvious to one having ordinary skill in the art to have the critical dimension of the first photoresist film pattern is 0.20 μm , since it has been held that where the

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general conditions of an invention are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

In claim 11, Ho et al. are applied supra, but fail to specify the critical dimension of the second photoresist film pattern is 0.13 μm .

It would have been obvious to one having ordinary skill in the art to have the critical dimension of the second photoresist film pattern is 0.13 μm , since it has been held that where the general conditions of an invention are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References not applied are considered state of the art in the area of semiconductor manufacture.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olivia T Luk whose telephone number is 571-272-1676. The examiner can normally be reached on 7AM to 4PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 571-272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

OTL
December 2, 2004


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